Fuels for Schools

Fuels for Schools is an initiative designed to help public schools and other public facilities reduce their heating costs while increasing forest health. The program promotes the use of biomass heating systems (biomass boilers) that can burn waste wood from hazardous fuels reduction projects.

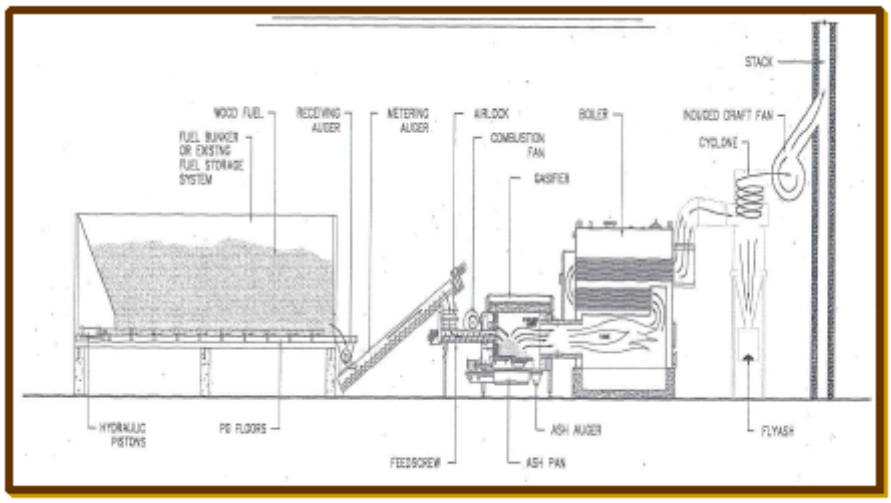
The federally funded initiative was targeted originally to the Intermountain West, but its roots lie in Vermont. The USDA Forest Service seeks to obtain adequate funding from Congress to expand the program's reach.[1] This briefing paper is intended to use what has been learned by similar initiatives across the country, and incorporate them into a program for Maine.

The western program[2]

- Program partners include the USDA Forest Service, Regions 1 and 4, five State Foresters (Montana, Idaho, Nevada, North Dakota, and Utah), schools, the Bitter Root RC&D, private sector businesses, and others.
- The program has four elements:
  - Funding/conducting Engineering Assessments;
  - Granting dollars for conversions;
  - Identifying existing financial resources; and,
  - Providing Technical Assistance.
- Accomplishments:
  - Montana has five schools with biomass heating systems; at least one school each in Nevada and Idaho also have such systems. Several more projects were underway as of late 2005 in various western states.
  - 21 schools with completed Engineering Assessments; 15-20 schools were to be assessed in 2004.
- The Future (after 2008):
  - Private Sector takes over;
  - Expertise is available;
  - Technology is commonplace;
  - Market competition keeps it strong.
- Darby, MT Pilot Project
  - The new biomass burner, which runs at 100 HP, replaced two steam operated boilers and one hot water boiler which ran at 265 HP, which will save the community $30,000 to $40,000 a year in heating energy consumption.
  - In addition, this project stands out because it hooks into two separate buildings and ties into three existing boiler systems. The existing boilers function as backup during extreme cold weather or during extremely mild weather.

[1] See Fuels for Schools briefing paper at end of this document.
[2] Adapted from www.fuelsforschools.org. The information on this site seems somewhat dated (or lacks updating).

Diagram from Darby Pilot Project



This drawing shows the basic mechanics of a typical wood chip burning, biomass system.

The Vermont Experience

The Biomass Energy Resource Center (BERC), based in Montpelier, Vermont, has played a leading role across the country in transitioning schools and other institutions to systems that use biomass fuel to produce heat and/or electricity. These projects include:

- Project manager for the Darby, MT school project;
- Preliminary study of the technical aspects of using biomass to replace fuel oil and generate electricity to support Middlebury College's Carbon Reduction Initiative; and,
- Revision of "Wood-Chip Heating Systems: A Guide for Institutional and Commercial Biomass Installations" under contract to the USDA Forest Service. This publication synthesizes a lot of information about developing and implementing a program, including economic analysis.

BERC and other partners have helped develop wood chip heat in Vermont schools for 15 years. Today, 10% of all students in Vermont are warmed by 25 school wood systems. BERC is partnering with Vermont's energy, forestry, and education agencies to develop and implement an initiative to accelerate the pace at which schools in Vermont install wood heating systems.

BERC seems to be a central location for expertise from project design to implementation, and seems well connected with a wide variety of funding sources, including USDA and DOE.

The Maine Experience

The Leavitt Area High School in Turner is apparently the first and only school in Maine using biomass as a heat source. It installed its system in 1998. An oil burner serves as backup.

Northeast Forest Biomass Energy Initiative (NFBEI)

The Biomass Energy Research Center and the Northern Forest Center have convened the NFBEI. This project is just getting underway. It aims to develop a biomass energy action plan for the Northern Forest region. It addresses issues far beyond heating schools.

Existing Resources

Several resources have been developed to assist schools and other institutions interested in installing biomass heating systems. These resources include access to technical assistance, system design, economic analysis, and project reports. A listing of some of these resources follows (some overlap and/or cross-reference each other):

- Biomass Energy Research Center (www.biomasscenter.org)
- Mount Wachusett Community College Renewable Energy (www.mwcc.edu/renewable)
- Fuels for Schools (www.fuelsforschools.org/)
- Middlebury College Biomass Heating Project
  - Preliminary assessment www.biomasscenter.org/reports/middlebury-biomass-chp.html
  - Fuel assessment www.familyforests.org/research/documents/MCBiomassReport.pdf

Next Steps for Maine

The information base exists. The technology exists. The tools to analyze investments in the technology exist. Multiple service providers exist. The following actions would help move institutional biomass heating into the mainstream:

- **Assessment of Need** – list of schools / facilities. An outreach initiative to make institutions aware of the opportunities and multiple sources of information and technical assistance.
    - Input - $20,000,
    - Outputs –
        - 1. A list of interested school systems and potential sites.
        - 2. A Maine website with connections to available resources and instructions for how to participate in Maine.
    - Partners – Maine Municipal Association, Department of Education, and Maine Principals Association.

- **Rigorous economic analysis**. The current analysis tools seem to work fine; however, assumptions about biomass supply prices vs. other fuels need serious examination in light of competition for the same wood among biomass energy plants, pulp mills, firewood processors, biorefineries, and others. The State of Maine is currently in a transition. The Pulp and Paper industry continues to put investments in technology and infrastructure out of state/country.
    - Input - $15,000,
    - Output - A clear understanding of the conditions which make conversion a viable option.
    - Partners – State Planning Office, USDA Forest Service, Department of Energy, Energy North East,
- **Ecological impact analysis**. Many parties interested in biomass appear to assume that there is and will continue to be an abundant supply that can be readily removed from the woods without consequences. This assumption needs more rigorous testing. An emerging body of science continues to demonstrate the important ecological functions of every part of a tree, including leaf litter, small branches, fallen logs, and snags. Further, many landowners now either use cut-to-length harvesting machines that drop branches and tops in front of the machine or backhaul slash from the landing on whole-tree operations, in both instances to protect the soil. With so much attention paid to Best Management Practices (BMP's), the "competition" between soil protection and biomass burning needs closer examination. Is this a good idea only if the fiber comes from sustainably managed forests?
    - Input $15,000
    - Output - A report on the biological impacts of different harvesting régimes.
    - Partners – USDA Forest Service, Manomet, Maine Natural Areas Program
- **Fiber supply assessment**. We need a much more robust modeling effort to understand better the possible future pathways in Maine's forests. How much of the inventory is really available when you take into consideration Certification, sustainability, Biodiversity, ownership patterns/preferences, BMP, FPA/regulatory
    - Input $250,000,
    - Output – A clearer understanding of the relationships which factor into the inventory process.
    - Partners – USDA Forest Service, Contracted Biomatrician,
- **New technology options**. This sector is changing weekly, Beyond burning biomass chips in a boiler, do opportunities exist for biofuels, gasification, and pellets (among others)? Someone needs to stay on top of this emerging industry. We need to be able to provide the best available information.
    - Inputs – $80,000

  - Output Governor level Coordination / Collaboration with stakeholders

- **Revolving loans**. The initial capital investment seems to be the largest financial barrier. The institutions that have reported on their investment payoff seem satisfied with the longer-term financial payoff; however, making the investment to get the system installed seems problematic. Establishing a revolving loan fund may be the best thing the state can do to energize activity. According to the BERC, a medium size school which burns an average of 40,000 gallons of fuel per year can expect to pay as much as $700,000 in conversion costs.
  - Input - $1,200,000
  - Output –
    - Technical Assistance / cost share
    - Demonstration Projects

Other partners

Department of Energy

Economic Development Administration

Department of Education

Other resources

http://www.apolloalliance.org/strategy_center/reports_and_resources/clean_energy_101/biomass101.cfm

http://mainegov-images.informe.org/dep/air/education/docs/Fall%202004.pdf

USDA Forest Service
Fuels for Schools Briefing Paper

Date April 3, 2006

Topic: Fuels for Schools (and other public buildings)

The Forest Service *Fuels for Schools* regional initiative is designed to facilitate use of woody biomass from our nation's forests by developing a viable, renewable energy source to be used to heat and cool public buildings. The Forest Service is now interested in expanding beyond this regional initiative to move the concept to states, and within tribal nations and rural communities nation-wide.

In the past year significant interest has been expressed by educators, states, tribal leaders, and community leaders to State and Private Forestry and State Foresters to expand the regional initiative nationally. The public request is for the Forest Service to provide leadership, information and funds for feasibility studies and to identify sources of woody biomass, particularly in areas where there are national forests.

Background: Using Forest Service National Fire Plan Economic Action Programs (EAP) dollars, the Forest Service Northern Region (R1) focused the use of these funds to launch a Fuels for Schools effort in 2001 and 2002. During 2003-2006 Congress earmarked dollars from the EAP program to complete demonstration projects in Montana. Funding from the regional EAP allocation was also used for technical assistance within the five states of the Northern and Intermountain Regions (MT, ID, NV, UT, ND) during 2003-2005. The funding provided the states with critical financial help they needed to build and support a Fuels for Schools initiative within their respective states. The Fuels for Schools effort was a verbal agreement among State Foresters and Regional Foresters in the two regions. It is a leadership action focused on developing a public/private partnership to help rural communities in and near National Forests. Current activity in the five states is being supported through federal, state, and private funding. **Except for the Montana earmark in FY 2006, EAP program funding is no longer available to support the State Foresters to leverage partnerships and implement projects.**

Many rural areas are looking for the information and technology necessary to help them reduce their energy costs for heating and cooling. Efforts are underway by the Forest Service to identify and align current USDA programs to help local school districts and municipal building owners identify loan programs from USDA Rural Development to fund these projects.

Summary:

Fuels for Schools started as a regional initiative to utilize woody biomass generated by hazardous fuel reduction projects in the wildland urban interface to reduce fuel costs for rural school districts using EAP and National Fire Plan funds. There have been several projects brought on-line, but there is currently no coordinated or funded national effort. Interest has been expressed from many other parts of the country for something like a "Fuels for Schools" program (as well as other municipal buildings) to help provide a local use for woody biomass from hazardous fuels treatment as well as removal and disposal of infected material from insect and disease to sustain a healthy forest. The popularity for this technology is high as the public seeks local renewable energy sources. Vermont has been successfully heating schools with wood for over 20 years and recently contacted the Forest Service and requested the use of the Fuels for Schools branding to expand and invigorate their program. The potential for this commercially available technology to be used nation-wide has been proven. The challenge is the adoption and professional application of woody biomass as a renewable energy source while retaining a link to sustaining healthy forests on all lands.

Contact: Marcia Patton-Mallory, Forest Service Woody Biomass and Bio-energy Coordinator, 970 295-5947 or Steve Yaddof, State and Private Forestry, 202 205-1386.